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ABSTRACT

This follow-up of the Cost, Quality, and Child Outcomes in Child Care Centers Study examined the long-term influences of child care experiences on children through elementary school. In the initial 1993 study, 828 children in 176 centers in North Carolina, California, Colorado, and Connecticut were followed from their 3-year-old year in child care through the end of second grade to examine relations between preschool child care quality and children's language, cognitive, and social development. This follow-up gathered school records and parent survey data on 339 children through the end of elementary school to examine longer-term indicators of school success, with this paper focusing on findings from the parent survey. Findings indicated that most parents reported that their children were performing well. Maternal education moderated the associations between child care quality and outcomes, indicating greater long-term effects for children of mothers with lower education levels. Teacher-child closeness was related to elementary school adjustment over time, with stronger effects for children of mothers with lower educational levels. Quality of preschool classroom practices predicted later school adjustment by sixth grade for children of mothers with lower educational levels, while there were no differences on the basis of preschool quality for children of mothers with higher educational levels. School adjustment scores for children of mothers with lower educational levels who experienced higher quality child care were similar to those of children whose mothers had higher levels of education. (Contains 17 references, 4 figures, and 1 table.) (KB)

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Introduction

This paper describes findings from a follow-up study of the Cost, Quality, and Child Outcomes in Child Care Centers Study, designed to examine the long-term influences of child care experiences on children through elementary school. In the initial study, begun in 1993, 828 children in 176 community child care centers in North Carolina, California, Colorado, and Connecticut were followed from their 3-year-old year in child care through the end of second grade to examine the relations between preschool child care quality and children's language, cognitive, and social development (Cost, Quality & Outcomes Study Team, 1995; Peisner-Feinberg et al., 1999; Peisner-Feinberg et al., 2001). The follow-up study is gathering school records and parent survey data on these children through the end of elementary school to examine longer-term indicators of school success. This paper reports findings from the parent survey component of the study, designed to look at the relations between earlier child care environments and parental reports of children's academic performance and adjustment to school throughout elementary school. Subsequent phases of the study will utilize school records information from kindergarten through sixth grade to examine the extent to which preschool child care quality has long-term effects on children's academic success.

Review of Literature

Few studies have examined the extent to which the quality of earlier child care experiences relate to children's patterns of development and achievement once they enter school. Such studies address the question of whether child care experiences have long-term effects on children's development in subsequent environments after they leave the child care environment. A number of studies of early intervention programs for children from low-income families have found some long-term positive effects on children's cognitive development and academic achievement at least through the third or fourth grade and sometimes longer, especially for indicators of school success such as retention in grade, special education placement, and intellectual functioning (e.g., Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997; Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Lazar, Darlington, Murray, Royce, & Snipper, 1982; Ramey et al., 2000; Schweinhart, Barnes, & Weikart, 1993). Research examining the longer-term effects of community child care has mostly been conducted with samples outside of the US. The findings from these studies have been inconsistent; some researchers have found lasting effects of child care experiences through school age (e.g., Broberg, Wessels, Lamb, & Hwang, 1997; Vandell, Henderson, & Wilson, 1988), while others have not (e.g., Chin-Quee & Scarr, 1994; Deater-Deckard, Pinkerton, & Scarr, 1996).

Cost, Quality, and Outcomes Study

Original Study Design

The present research is part of the Cost, Quality, and Child Outcomes (CQO) in Child Care Centers Study, a study of center-based community child care and children's longitudinal outcomes in four states in the United States. The data collected as part of the original study

included measurements of preschool child care quality and cost, as well as longitudinal assessments of children's language, cognitive, and social development. Cost and quality data were gathered on an initial sample of 401 child care centers that were randomly selected from four regions in the United States: Los Angeles County in California, the Hartford corridor in Connecticut, the Frontal range in Colorado, and the Piedmont region in North Carolina. These regions were selected because they varied widely in both economic climate and the stringency of state regulations regarding child care. For the outcomes phase of the study, an initial sample of 828 children was followed over a 5-year period from their next-to-last year in preschool through second grade. The outcomes component included 183 of the preschool classrooms (only those serving 3-year-olds were eligible) in 176 of the original 401 centers.

The present analyses include classroom quality measures from the original study to examine the long-term effects of child care quality on children's school adjustment and performance through the end of elementary school. Two aspects of quality were examined: classroom practices and teacher-child relationships. The quality of classroom practices was measured using three observational measures: (1) classroom environment was measured using the Early Childhood Environment Rating Scale (ECERS; Harms & Clifford, 1980); (2) teacher sensitivity was measured with the Caregiver Interaction Scale (CIS; Arnett, 1989); and (3) teacher responsiveness was measured with the Adult Involvement Scale (AIS; Howes & Stewart, 1987). For the current analyses, a composite index of the quality of classroom practices was computed using the ECERS, CIS, and AIS. The second aspect of quality, teacher-child relationships, was measured by teachers' ratings of their relationship with each participating child using the 30-item Student-Teacher Relationship Scale (STRS; Pianta, 1992). The closeness factor from the STRS was used in these analyses.

Summary of Original Study Findings

In the first phases of the Cost, Quality, and Outcomes (CQO) Study, we found positive relations between different aspects of child care quality in preschool (children's 3-year-old year) and children's longitudinal outcomes from preschool through elementary school (end of kindergarten or second grade) for both cognitive and socioemotional measures (Peisner-Feinberg et al., 2001). Both language ability and math skills were positively related to the observed quality of child care classroom practices. Children with closer relationships with their child care teachers also evidenced better cognitive/attention skills and sociability and fewer problem behaviors. In addition, family background characteristics moderated some of these associations, so that child care quality had a stronger influence on children's math skills and problem behaviors for children with less highly educated mothers. The present component of the CQO study provides information about the long-term elementary school success and academic achievement of children in relation to early variations in child care, as well as considers the extent to which these relations differ on the basis of child and family background characteristics.

Theoretical Model

Our research design has been guided by a bioecological theoretical perspective (Bronfenbrenner & Morris, 1998), in which development is viewed as the interactions, or proximal processes, that occur between individuals and their environments. The influence of these processes on development varies as a function of person characteristics (measured in our study as child background characteristics), environmental contexts (measured as family background characteristics and child care quality), and the time periods in which these processes occur (measured both concurrently in child care and longitudinally through the end of

elementary school). The present paper examines the influences of these processes on children's elementary school adjustment and academic performance as reported by parents.

Follow-up Study Design

Research Questions

Children's outcomes through sixth grade based on the parent survey data were examined as a function of earlier measures of child care quality and family background characteristics. We addressed the following research questions:

(1) To what extent does the level of preschool child care quality predict children's school success and academic achievement throughout elementary school?

(2) Are there differential influences of variations in child care environments on the basis of family background characteristics?

Sample

The sample for this component of the study consists of 339 children and families, representing as many of the original 828 children as we could track 8 years later through mailings, phone calls, and a variety of database searches. At the time of data collection, most of these children had completed sixth grade, so we were able to gather data about children's entire elementary school careers. Between the spring and fall of 2001, families were sent parent surveys with stamped self-addressed envelopes for return. As shown in Table 1, the analyses reported in this paper include surveys from 339 families in all four of the original states (84 from California, 85 from Colorado, 71 from Connecticut, and 99 from North Carolina), and represent children from most of the original centers (128 of 176) and classrooms (150 of 183) included in the longitudinal outcomes component.

Parent Survey Measure

The parent survey asked parents to provide updated demographic information (household composition, parental employment, and family income) and parent perceptions of their children's adjustment to school and school success. Specifically, we gathered outcomes data on children's experiences from kindergarten through sixth grade for the following variables: child's adjustment to school (on an 8-item scale), child's school performance (grades), perception of overall direction child is headed, parental expectations for children's education, grade retention, identification of giftedness, identification of disabilities, referrals for special services for academic and behavioral problems, and suspensions/expulsions. In addition, longitudinal data about children's school adjustment were also examined, based on parents' ratings using the same 8-item scale in previous years (kindergarten, first, and second grade).

Analytic Methods

First, descri tive analyses were performed to examine parents' perceptions of their children's adjustment to school and academic performance throughout elementary school. Means and frequencies, as appropriate, were calculated for each of the key outcome variables.

Second, a series of inferential analyses were conducted to examine the relations between preschool child care quality and children's elementary school adjustment and performance, controlling for child and family background characteristics. In addition, child and family background characteristics were examined to see whether they moderated the influences of child care quality on children's later outcomes. A set of regression analyses were performed to examine the associations of two different aspects of preschool child-care quality (observed classroom practices and ratings of teacher-child closeness) with parent-reported child outcomes at the end of elementary school. General linear models were used to predict the summary ratings

of children's adjustment to school and the ratings of children's school performance (grades). Logistic models were used to predict the log-odds for the following seven dichotomous outcomes: ever identified as gifted, ever retained, ever suspended or expelled, ever referred for academic services, ever referred for behavioral services, having a 'very positive' overall direction, and parents' expectation of the child earning a graduate degree. All models included the child care quality measures, state, and four background variables as covariates: gender, race (White vs. not White), mother's education (in years), and family income. The general model also included two two-way interaction terms between each preschool quality measure and maternal education to test whether maternal education moderated the effects of child care quality. Block tests were performed to test the significance of the two aspects of child care quality (classroom practices and teacher-child closeness) as a block, as well as for the set of interactions between child care quality and maternal education. Individual effects were interpreted only when the block test was significant.

An additional longitudinal analysis was performed looking at the association between observed classroom practices and school adjustment over time, using the school adjustment ratings from kindergarten, first, second, and sixth grade. A hierarchical linear model (HLM) was used for this analysis and included state, the four child and family background variables (gender, race, mother's education, and family income), year, all two-way interactions between year and the other variables in the model, two-way interactions of mother's education with each of the quality measures (observed classroom practices and teacher-child closeness), and the two three-way interactions between year, mother's education, and quality. Separate slopes and intercepts were estimated for each child and from these the group growth curves were computed as a function of the background characteristics.

Results

Descriptive Analyses

Most of the parents in the study reported their children's school adjustment and performance as generally positive. As seen in Table 2, parents report their children as being adjusted very well to school, with an average overall school adjustment score of 7.74 on a 10-point scale. Most parents (69%) believe that their children are headed in a very positive direction. In terms of their long-term expectations, a substantial majority (89%) of parents expect that their children will complete college, with 57% expecting that they will earn a bachelor's degree and 32% expecting a master's or doctorate degree. Parent reports of grades were also high—81% of parents report that their children receive mostly As or Bs. In addition, 35% of parents reported that their children have been identified as gifted. Nevertheless, children's outcomes vary, with 5% of the children were reported to have been retained in grade during the elementary years. A total of 18% of children have been referred for academic (14%) or behavioral (6%) services at some point in their elementary school careers, with some children referred for both. In addition, 10% of the children had received an in-school or out-of-school suspension or were expelled in elementary school. Consistent with national averages on the number of children with disabilities, parents report that about 13% of the children currently have IEPs, with a variety of identification categories reported.

Inferential Analyses

The inferential analyses revealed significant relations between child care quality and two of the parent-reported outcome measures, school adjustment and overall direction. In both cases, maternal education exhibited a moderating effect, so that these relations were only significant for children whose mothers had lower levels of education.

Parental reports of the overall direction children were heading were collapsed into a dichotomous variable with a response of 'very positive' coded as 1 and all other responses coded as 0. The results of the logistic model indicated that child care quality (classroom practices) in preschool were related to parental perceptions of overall direction in elementary school for children whose mothers have less education (see Table 3). There was a significant interaction between maternal education and the classroom practices quality index, (β = -.169; $p < .001$). To illustrate these findings, we estimated the relations between child care quality and children's overall direction for children whose mothers have a high school education versus a college education. As seen in Figure 1, among children whose mothers have only a high school education the log-odds of having a 'very positive' overall direction increases by 0.45 for each 1-point increase on the quality index, so that children in classrooms scoring in the good range (mean=5.5) are 4.8 times more likely to be viewed as heading in a very positive direction than children in poor quality classrooms (mean=2.0). In comparison, the relation between the quality index score and overall direction for children whose mothers have a 4-year college degree was not significant (β = -.228; p = .204).

For parental reports of children's school adjustment at grade 6, there was a statistically significant interaction between maternal education and the classroom practices index (β = -0.10; p = 0.012), indicating that preschool child care quality was related to children's later school adjustment (see Table 4). To illustrate these findings, we estimated the relations between child care quality and school adjustment for children whose mothers have a high school education versus a college education. For example, as seen in Figure 2, among children whose mothers have only a high school education the expected mean school adjustment score increased .35 points for each 1-point increase on the quality index. In contrast, for children whose mothers

have a college degree, the relation between quality and school adjustment was not statistically significant (β = -0.060; p = 0.57).

The final set of analyses examined the longitudinal relations between school adjustment and child care quality over time from kindergarten through sixth grade, and examined whether maternal education served as moderating factor (see Table 4). The results indicated that preschool child care quality predicted children's longitudinal school adjustment more strongly for children whose mothers had lower levels of education. There was a main effect for teacher-child closeness and a significant two-way interaction between teacher-child closeness and maternal education indicating that the quality of teacher-child relationships in preschool was positively related to children's later school adjustment, with even stronger associations for children whose mothers had lower levels of education. Figure 3 illustrates this association, estimating these differences for children whose mothers have high school vs. college educations who attended low (25th percentile) vs. high (75th percentile) quality care. In addition, there was a significant three-way interaction among classroom practices, maternal education, and year, indicating that while classroom quality did not influence school adjustment at kindergarten, by 6th grade there was a significant association between classroom quality and school adjustment for children whose mothers have less education. As seen in Figure 4, for example, there is little difference in children's kindergarten (age 6) adjustment scores on the basis of child care quality for those whose mothers have a high school education versus a college education. However, by 6th grade (age 12), for children whose mothers have a high school education, school adjustment scores are substantially lower for children who experienced lower quality care in preschool (estimated at the 25th percentile) than those who experience higher quality in preschool (estimated at the 75th percentile), while child care quality has little effect for children whose

mothers have a college education. Moreoever, there is little difference in the school adjustment scores between children whose mothers have a high school education who experienced higher quality preschool child care and children whose mothers have a college degree.

Conclusions

Because so many children are experiencing center-based child care before they enter school, it is important to examine the longer term effects of variations in the quality of these preschool experiences on children's development and subsequent success in school. The findings reported here offer some evidence that child care quality continues to predict children's development and school success throughout the elementary school years. In particular, although most parents reported that their children are doing pretty well, we found some long-term effects of children's early childhood experiences on parental perceptions of how children are doing in school, especially for children at greater risk. In all cases, maternal education moderated the associations between child care quality and children's outcomes, indicating that there were greater long-term effects for children whose mothers had lower levels of education. Significant effects were found for parental reports of whether children were heading in a very positive direction overall and for children's school adjustment in sixth grade. Further, in a longitudinal analysis of children's school adjustment from kindergarten through sixth grade, effects were found for both aspects of child care quality, classroom practices and teacher-child closeness. Teacher-child closeness was related to children's elementary school adjustment over time, with even stronger effects for children whose mothers had lower levels of education. Further, the quality of classroom practices in preschool predicted later school adjustment by sixth grade for children whose mothers had lower levels of education, while there were no differences on the basis of child care quality for children whose mothers had higher levels of education. Moreover,

the school adjustment scores for children whose mothers had lower levels of education who experienced higher quality child care were similar to those of children whose mothers had higher levels of education.

One limitation of these findings is that the data included only parental reports of children's school performance and adjustment. In the next phase of the study, we will be analyzing data from children's actual school records to determine whether child care quality affects broader school outcomes. However, the results reported here, combined with findings from previous phases of this study (Peisner-Feinberg et al., 2001), suggest that there are long-term effects of child care quality throughout elementary school. These findings provide support for the importance of high-quality preschool experiences not only for promoting school readiness, but also for ensuring positive developmental trajectories throughout elementary school, especially for children at greater risk.

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Table 1

Follow-up Study of Children in Child Care Parent Survey Sample Size

Total	CA	CO	CT	NC
339	84	85	71	99

Table 2

Parental Report of Children's School Performance

Parent Report Variables	M	SD	Min	Max
Overall School Adjustment	7.74	1.54	2.63	10.00
Overall Direction	**Percent**		**Number**	
Very positive	69		234	
Somewhat positive	26		87	
Somewhat negative	5		17	
Very negative	0		1	
Parental Expectations				
Less than bachelor's degree	11		38	
Bachelor's degree	57		193	
Master's or doctorate	32		108	
Overall School Performance				
Excellent (As)	44		149	
Above average (Bs)	37		126	
Average (Cs)	15		52	
Below average (Ds)	4		12	
Unsatisfactory (Fs)	0		0	

Table 2 continued

	Percent	Number
Identified as Gifted	35	120
Retained in Grade	5	18
Referred for Special Services: Academic	14	49
Referred for Special Services: Behavioral	6	19
Suspended or Expelled	10	33
Current IEP	13	43
Identification of Children with IEPs[a]		
Learning Disabled	33	14
Speech/Language Impaired	7	3
Behavioral/Emotional Disabled	9	4
ADD/ADHD	35	15
Other Disabled	7	3
Gifted	30	13
Not Specified	23	10

[a]Note: Percentages sum to more than 100 due to children identified in more than one category.

Table 3

Regression Results of Relation between Preschool Child Care Quality and Parental Perceptions of Overall Direction Child is Heading

	β	SE
State	---	---
Background characteristics	---	---
Maternal education	0.160	0.068
Teacher-child closeness	0.184	0.260
M. ed. x T-C closeness	-0.105	0.115
Classroom practices index	-0.031	0.151
M. ed. x Classroom practices	-0.169**	0.065
Quality slope, M. ed. = 12	0.449*	0.220
Quality slope, M. ed. = 16	-0.228	0.179

Note: * $p < .05$ ** $p < .01$ *** $p < .001$

Table 4

Regression Results of Relation between Preschool Child Care Quality and Children's Elementary School Adjustment

	School Adjustment			
	Grade 6		Over Time	
	β	SE	β	SE
State	---	---	---	---
Background characteristics	---	---	---	---
Maternal education	0.119	0.040	0.051	0.024
M. ed. x Year			0.009	0.007
Teacher-child closeness	0.229	0.167	0.230***	0.056
T-C closeness x M. ed.	-0.128	0.069	-0.051*	0.023
Quality slope, Ed = 12			0.373***	0.081
Quality slope, Ed = 16			0.169**	0.065
T-C closeness x Year			-0.005	0.026
Classroom practices index	0.061	0.093	0.018	0.054
Classroom practices x M. ed.	-0.104*	0.041	-0.041	0.024
Quality slope, Ed = 12	0.358*	0.145		
Quality slope, Ed = 16	-0.060	0.106		
Classroom practices x Year			0.010	0.012
M. ed. x T-C closeness x Year			-0.014	0.011
M. ed. x Practices x Year			-0.021**	0.007
Quality slope, M. ed. = 12, Kindergarten			-0.009	0.085
Quality slope, M. ed. = 12, 1st Grade			0.058	0.079
Quality slope, M. ed. = 12, 2nd Grade			0.124	0.080
Quality slope, M. ed. = 12, 6th Grade			0.391**	0.136
Quality slope, M. ed. = 16, Kindergarten			-0.001	0.068
Quality slope, M. ed. = 16, 1st Grade			-0.015	0.063
Quality slope, M. ed. = 16, 2nd Grade			-0.029	0.063
Quality slope, M. ed. = 16, 6th Grade			-0.084	0.103

Note: * $p < .05$ ** $p < .01$ *** $p < .001$

Figure 1
Parental Perceptions of Children's Overall Direction by Quality of Child Care Classroom Practices and Maternal Education

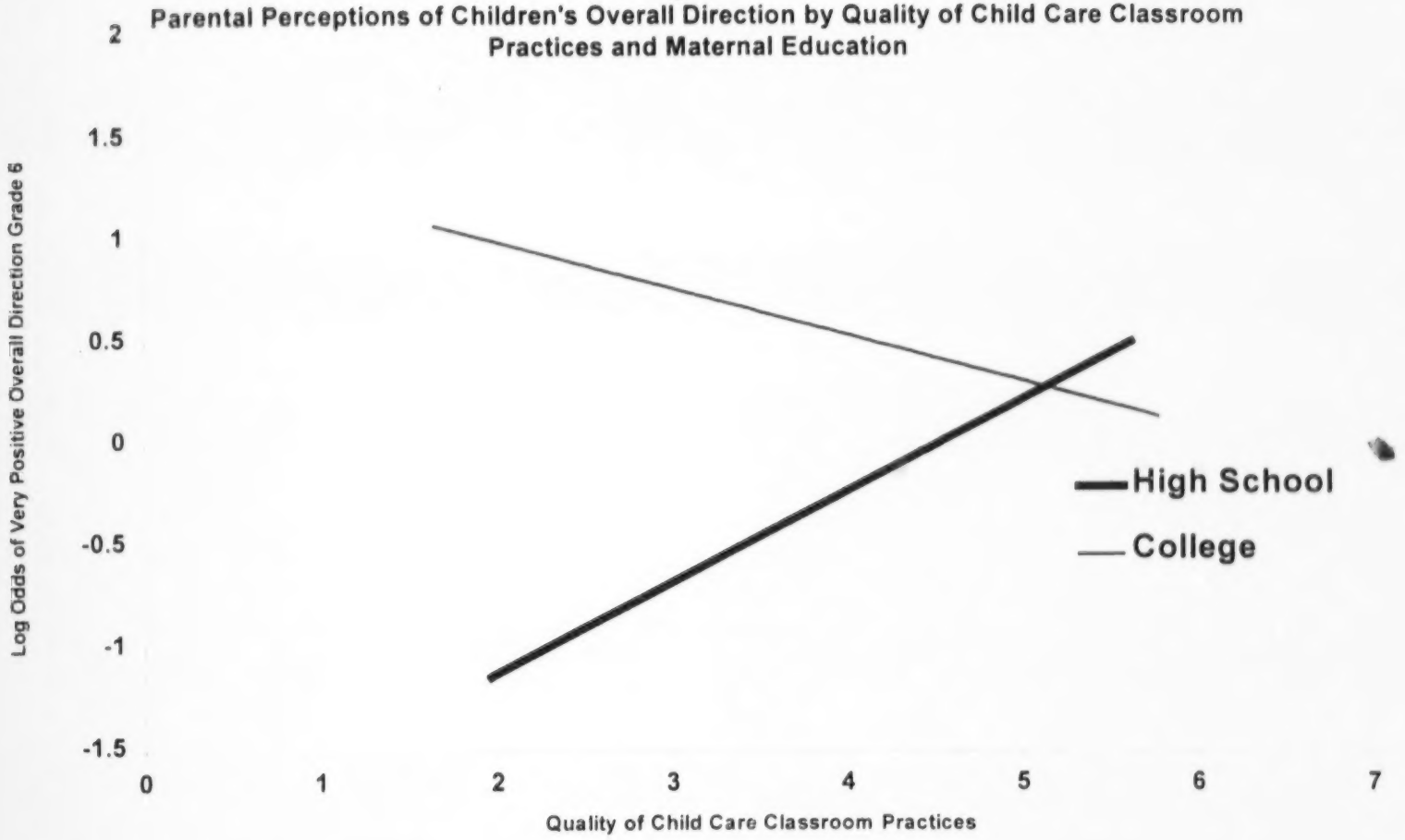

Figure 2
Parental Perceptions of Children's School Adjustment in Sixth Grade by Quality of Child Care Classroom Practices and Maternal Education

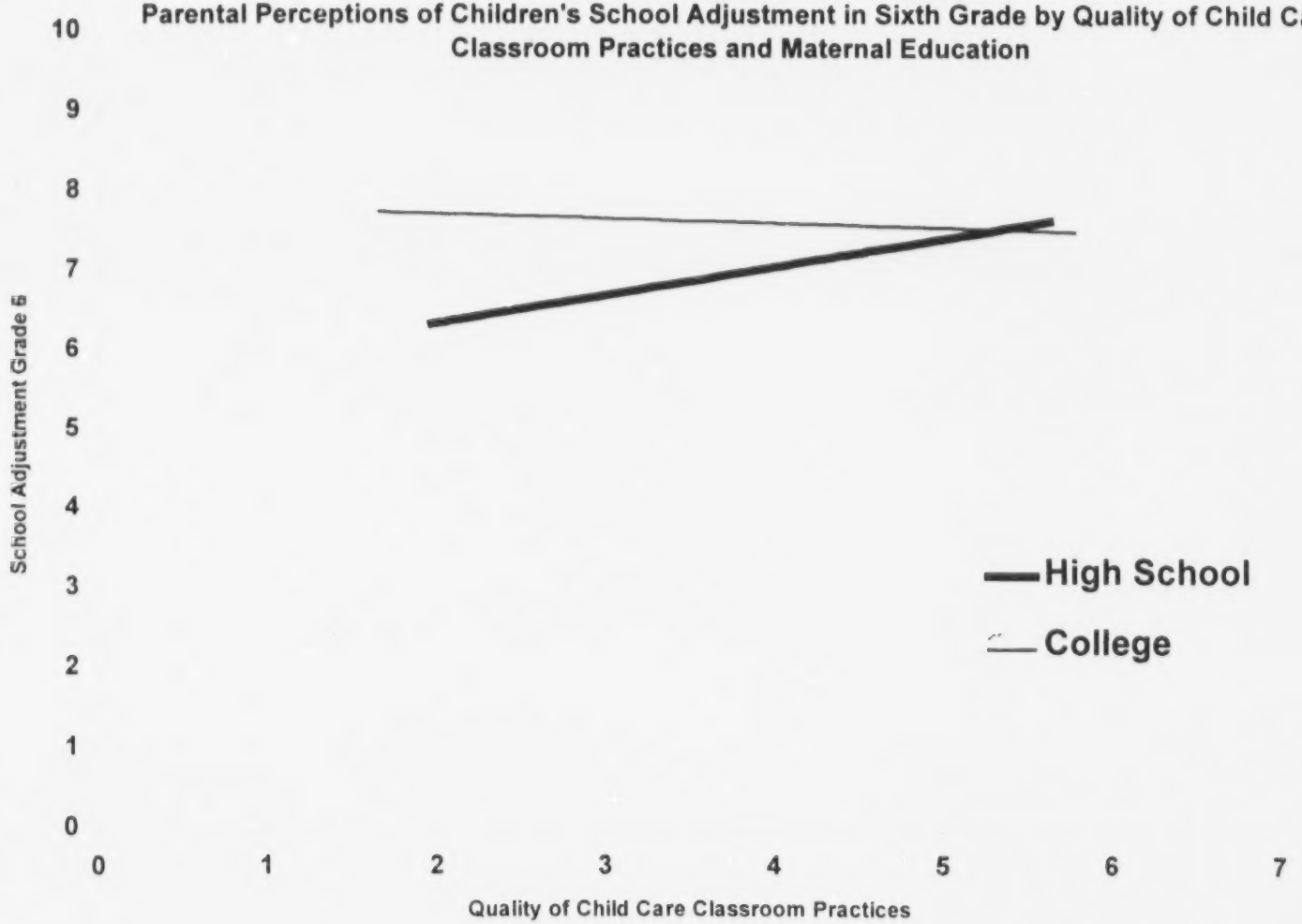

Figure 3
Parental Perceptions of Children's School Adjustment Over Time by Teacher-Child Closeness and Maternal Education

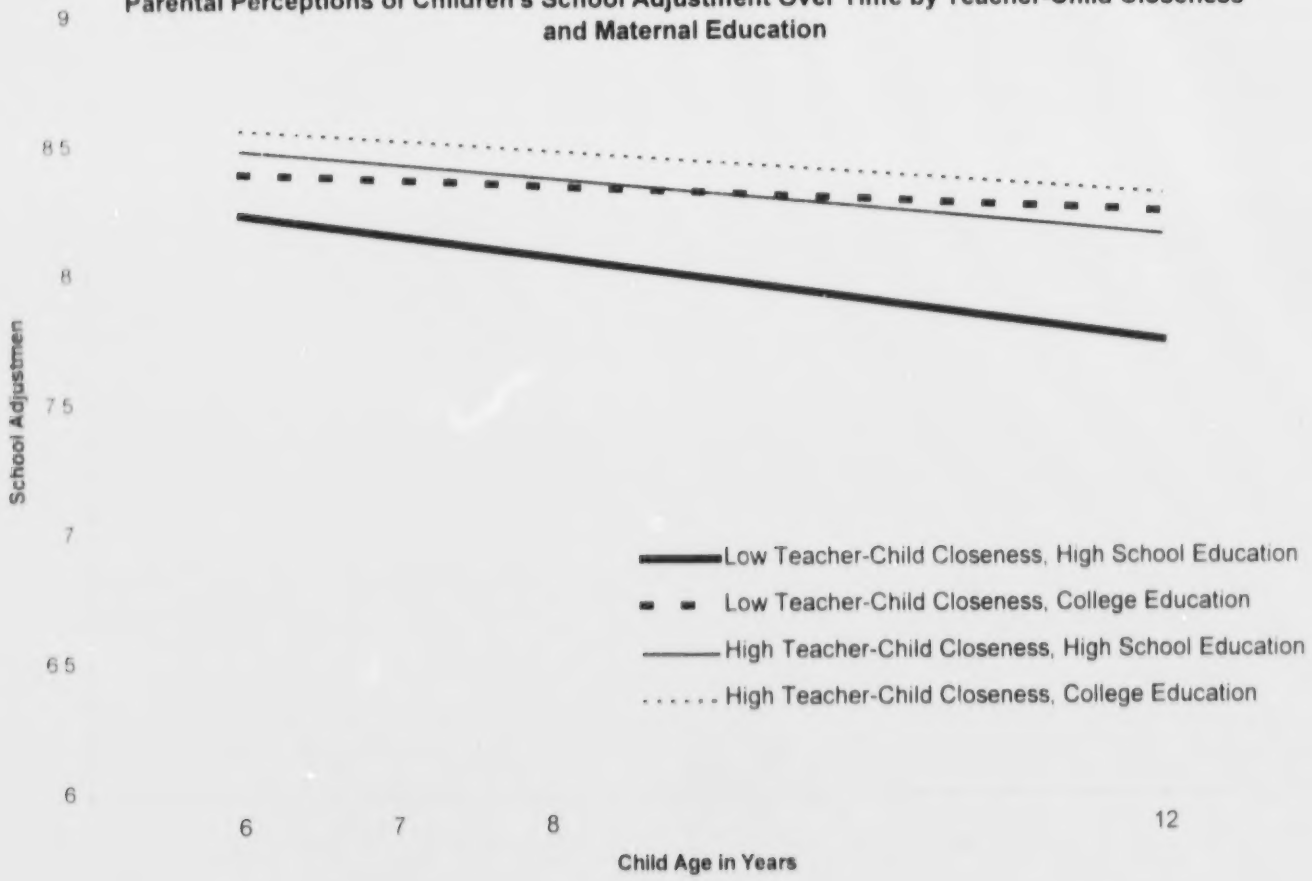

Figure 4
Parental Perceptions of Children's School Adjustment Over Time by Quality of Child Care Classroom Practices and Maternal Education